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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/749,637	12/31/2003	Barrett E. Cole	H0005547-0760(1100.122910	9413

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EXAMINER
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MILLER, DANIEL H

ART UNIT	PAPER NUMBER
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1775

DATE MAILED: 07/12/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/749,637	<b>Applicant(s)</b> COLE ET AL.	
	<b>Examiner</b> Daniel Miller	<b>Art Unit</b> 1775	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 4/27/2006.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-34 is/are pending in the application.
- 4a) Of the above claim(s) 1-9 and 17-25 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 10-16 and 26-34 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election of group I claims 10-16 in the reply filed on 4/27/2006 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 27-32 recite the limitation "first material" in body of claim. There is insufficient antecedent basis for this limitation in the claim. Independent claim 26 as amended does not recite a first material.

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States

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only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 26-28, 30, and 33-34 are rejected under 35 U.S.C. 102(e) as being anticipated by Son et al (U.S. 2004/01619129).
3. Regarding claim 26, Son teaches an insulating substrate with a first material or passivation layer (430 barrier layer) deposited on a substrate (401) and an island of second material (510 catalyst) formed on the first material (figure 8). Regarding claim 27, the first material can be titanium nitride (0041). Regarding claim 30, the second material is nickel, cobalt or iron (0042 and 0045). Regarding claim 33, the substrate can be silicon, quartz, glass or ceramic (0039). Regarding claim 34, the island (catalyst layer) comprises carbon nanotubes extending from the island (figure 9 and 10 and 0048). The island of catalyst material is grown through the via that runs through first layer (see figures)

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claim 26 is rejected under 35 U.S.C. 102(b) as being anticipated by Lee et al (U.S. 6,339,281B2).
5. Lee teaches an insulating substrate (1) with a first material (passivation layer) (2) deposited on the substrate and an island of catalyst (second) material (9) formed on the first material (figure 2H and column 4 Line 2-10, 28-35) are grown through an aperture (via) (see figures).

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6. Claims 26, 27 are rejected under 35 U.S.C. 102(e) as being anticipated by Hsu (U.S. 6,890,233 B2).

7. Hsu teaches an insulating substrate (column 6 line 20-30) with a (passivation layer) transition metal nitride conductive layer (column 7 line 45-55). Then an adhesion second layer is added. Regarding claim 27, the first layer can be HfN or TiN (column 7 line 48-55). Regarding claim 34, a carbon nanotube array is grown on the second layer (figure 28) inside a via (see figures).

### ***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 10-16, and 28-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Son et al (U.S. 2004/01619129) in view of Shen et al U.S. 6,143,474 further in view of Zenke et al (U.S. 5,187,557).

10. Regarding claim 10, Son, discussed above, further discloses a resistor layer (typically an oxide layer, see Shen et al U.S. 6,143,474 for description of oxidized substrate figure 2) followed by a titanium nitride layer (barrier layer claim 1) and then

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covered with a passivation layer (# 460 figure 8). However, the reference is silent as to the presence of HfN and the composition of the resistor layer.

11. Zenke discloses that titanium nitride and hafnium nitride are routinely interchangeable in semiconductor applications (see claim 4 Zenke).

12. Therefore, as it is taught by Zenke that a HfN and TiN layers are interchangeable, it would be obvious to substitute HfN for TiN since the two are interchangeable within the technology. However, Zenke is silent as to the presence of a resistor or oxide layer.

13. It would have further been obvious to use a conductive oxide layer because since Shen teaches that a resistor layer is an oxide layer (see Shen et al U.S. 6,143,474 for description of oxidized substrate figure 2).

14. Son further discloses a hole through the passivation layer to the TiN layer where the catalytic island is formed (510 of figure 8-10). The catalytic layer is in contact with the TiN layer. Regarding claims 11-16, carbon nanotubes are grown on the catalytic island as discussed above using a plasma deposition and etching process with temperatures ranging from 500 C to 900 C. However the reference teaches TiN and is silent as to a HfN layer. Claims 11, 12, 15, 16 are considered intended use only and do not structurally define over the prior art. A carbon nanotube is not positively recited in the claims. Regarding claims 28-29, it would be obvious to make the material stoichiometric or non-stoichiometric absent a showing of criticality with respect to this feature.

15. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Son et al in view of Gossen (U.S. 5,710,656) or Liu et al (U.S. 6,268,615B1).

16. Son, discussed above, discloses an electron-emitting device used to display an image using visible light (see 0003) but is silent as to the use of ITO as a first layer.

17. Goossen and Liu both teach a first layer having ITO. The layers are used because of their applicability in optical applications such as photodetectors (see Liu abstract). The ITO coating having a unique reaction to light (see Liu et al claims 8 and 9).

18. As it is taught by Goossen and Liu that it is commonly known to use a ITO layer for optical applications such as photodetectors it would have been obvious to use an ITO oxide first layer if using the device for similar optical applications like Goossen and Liu because they have a unitary purpose.

19. Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Son et al (U.S. 2004/01619129) in view of Shen et al U.S. 6,143,474.

20. Son, discussed above, is silent as to the first material being a protective oxide.

21. Shen teaches a resistor layer is typically an oxide layer; see Shen et al U.S. 6,143,474 for description of oxidized substrate figure 2.

22. As it is taught by Shen that it is known to form a resistor layer as a conductive oxide, it would have been obvious to use a conductive oxide since it is typical and common in the art.

### ***Response to Arguments***

23. Applicant's arguments filed 4/26/2006 have been fully considered but they are not persuasive. Applicant has failed to provide any reasoning for why they think the claim limitations are not met by the present art. Further it is noted that the claimed layers do not require that the layers are directly deposited onto one another. Applicant appears to merely state that the prior art does not disclose the claimed subject matter but offers no clear argument as to how or why this is true. As stated in the body of the rejections, the art discloses or renders obvious the claimed subject matter.

### ***Conclusion***

24. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any



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extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel Miller whose telephone number is (571)272-1534. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on (571) 272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Daniel Miller



JENNIFER C. MCNEIL  
SUPERVISORY PATENT EXAMINER

7/7/06